WHAT IS CLAIMED IS:

1. A process for preparing a conjugated diene polymer or copolymer block having a varying amount of branching comprising combining:

(a) an anionic polymerization site;

(b) a conjugated diene monomer; and

(c) a microstructure control agent;

under reaction conditions sufficient to form a living polymer admixture and, at a point in the process prior to the completion of the polymerization of the conjugated diene monomer, combining the living polymer admixture with a microstructure control agent deactivant to mitigate or eliminate the effect of the microstructure control agent.

2. The process of Claim 1 wherein the conjugated diene monomer is selected from the group consisting of 1,3-butadiene, isoprene, piperylene, methylpentadiene, 1,3-cyclohexadiene, 1,3-cylcohepatdiene, 1,3-cyclooctadiene phenylbutadiene, 3,4-dimethyl-1,3-hexadiene, 4,5-diethyl-1,3-octadiene, and mixtures thereof.

3. The process of Claim 2 wherein the conjugated diene monomer is 1,3-butadiene.

4. The process of Claim 1 wherein the process is a process for preparing a conjugated diene copolymer block and the anionic polymerization site is a living polymer.

5. The process of Claim 4 additionally comprising a step of preparing the anionic polymerization site by admixing a monomer different from the conjugated diene monomer with an initiator.

6. The process of Claim 5 wherein the monomer different from the conjugated diene monomer is styrene.

7. The process of Claim 1 wherein the microstructure control agent is a Lewis Base.

8. The process of Claim 7 wherein the Lewis Base is selected from the group consisting of :

diethyl ether;
1,2-diethoxy-ethane;
1,2-diethoxy-propane;
o-dimethoxy-benzene;
1-t-butoxy-2-n-butoxy-ethane;
$n\text{-}C_4H_9OCH_2CH_20\text{-}n\text{-}C_4H_9$;
$n\text{-}C_4H_9OCH_2CH_2OCH_2OCH_3$;
$n\text{-}C_4H_9OCH_2CH_2OCHCH_3OCH_2CH_3$;
$n\text{-}C_4H_9OCH_2CH_2O\text{-}t\text{-}C_4H_9$;
$n\text{-}C_4H_9OCH_2CH_2OCHCH_3\text{-}O\text{-}i\text{-}C_4H_9$; and
mixtures thereof.

9. The process of Claim 1 wherein the microstructure control agent deactivant is a metal alkyl compound is selected from the group consisting of aluminum, zinc and magnesium alkyls having from 1 to 20 carbon atoms per alkyl substituent and mixtures thereof.

10. The process of Claim 9 wherein the aluminum, zinc and magnesium alkyls having from 1 to 20 carbon atoms per alkyl substituent and mixtures thereof is selected from the group consisting of:

triethylaluminum,
trimethylaluminum,
tri-n-propylaluminum,
tri-n-butylaluminum,
triisobutylaluminum,
tri-n-hexylaluminum,
trioctylaluminum.
butylethylmagnesium,
di-n-butylmagnesium,
di-n-hexylmagnesium,
dimethylzinc,
diethylzinc,
di-n-propylzinc,
diisobutylzinc,
di-n-butylzinc, and
mixtures thereof.

11. The process of Claim 10 wherein the microstructure control agent deactivant is triethylaluminum.

12. The process of Claim 1 wherein the microstructure control agent deactivant is added to the living polymer at a ratio of microstructure control agent deactivant to microstructure control agent of from about 0.1:1 to about 2:1.

13. The process of Claim 12 wherein the microstructure control agent deactivant is added to the living polymer at a ratio of microstructure control agent deactivant to microstructure control agent of from about 0.5:1 to about 1.1:1.

14. The process of Claim 13 wherein the microstructure control agent deactivant is added to the living polymer at a ratio of microstructure control agent deactivant to microstructure control agent of about 1:1.

15. The process of Claim 1 wherein the microstructure control agent deactivant is added at a point in the process where from about 25 percent to about 75 percent of the conjugated diene monomer has been polymerized and incorporated into the living polymer.

16. The process of Claim 15 wherein the microstructure control agent deactivant is added at a point in the process where about 50 percent of the

conjugated diene monomer has been added and incorporated into the living polymer.

17. The process of Claim 6 further comprising using a coupling agent to form a coupled block copolymer.

18. A polymer or copolymer block prepared using a process for preparing a conjugated diene polymer or copolymer block having a varying amount of branching comprising combining:

(a) an anionic polymerization site;

(b) a conjugated diene monomer; and

(c) a microstructure control agent;

under reaction conditions sufficient to form a living polymer admixture and, at a point in the process prior to the completion of the polymerization of the conjugated diene monomer, combining the living polymer admixture with a microstructure control agent deactivant to mitigate or eliminate the effect of the microstructure control agent.

19. A composition of matter comprising a conjugated diene polymer prepared by the anionic polymerization of a conjugated diene monomer, the polymer having a general structure:

$$B^1\text{-}B^2\text{-}B^3$$

wherein:

B^1 represents a region of the polymer prepared in the absence of a microstructure control agent;

B^2 represents a region of the polymer prepared in the presence of a microstructure control agent; and

B^3 represent a region of the polymer prepared in the presence of a microstructure control agent and a microstructure control agent deactivant.

20. The composition of matter of Claim 19 further comprising a copolymer block, the composition of matter having a general formula:

$$A\text{-}B^1\text{-}B^2\text{-}B^3$$

wherein:

B^1 represents a region of the polymer prepared in the absence of a microstructure control agent;

B^2 represents a region of the polymer prepared in the presence of a microstructure control agent;

B^3 represent a region of the polymer prepared in the presence of a microstructure control agent and a microstructure control agent deactivant; and

A is a block prepared using a different monomer.

21. The composition of matter of Claim 20 further comprising the product of coupling the composition of matter of Claim 20, the coupled block copolymer having the general formula:

$$A\text{-}B^1\text{-}B^2\text{-}B^3\text{-}x\text{-}B^3\text{-}\ B^2\text{-}\ B^1\text{-}A$$

wherein:

B^1 represents a region of the polymer prepared in the absence of a microstructure control agent;

B^2 represents a region of the polymer prepared in the presence of a microstructure control agent;

B^3 represent a region of the polymer prepared in the presence of a microstructure control agent and a microstructure control agent deactivant;

A is a block prepared using a different monomer; and

x is the residue of a coupling agent.

22. The composition of matter of Claim 19 wherein B^1-B^2-B^3 is prepared by the anionic polymerization of butadiene.

23. The composition of matter of Claim 20 wherein B^1-B^2-B^3 is prepared by the anionic polymerization of butadiene and A is prepared by the anionic polymerization of styrene.

24. A composition of matter comprising a conjugated diene polymer prepared by the anionic polymerization of a conjugated diene monomer, the polymer having a general structure:

$$B^1\text{-}B^2\text{-}B^3$$

wherein: B^1, B^2, and B^3 each represent a region of the polymer having a different vinyl content from the adjacent region or regions and there is no residue of a coupling agent between the blocks.

25. The composition of matter of Claim 24 further comprising a copolymer block, the composition of matter having a general formula:

$$A\text{-}B^1\text{-}B^2\text{-}B^3$$

wherein A is a block prepared using a different monomer.

26. The composition of matter of Claim 25 further comprising a block copolymer, the copolymer having a general formula:

$$A\text{-}B^1\text{-}B^2\text{-}B^3\text{-}A$$

27. The composition of matter of Claim 25 further comprising the product of coupling the composition of matter of Claim 25, the coupled block copolymer having the general formula:

$$A\text{-}B^1\text{-}B^2\text{-}B^3x\text{-}B^3\text{-}\ B^2\text{-}\ B^1\text{-}A$$

wherein x is the residue of a coupling agent.

28. A composition of matter comprising a conjugated diene block copolymer prepared by the anionic polymerization of a conjugated diene monomer, the polymer having the general structure:

$$B^1\text{-}B^2\text{-}B^3$$

wherein B^1 represents a diene polymer block having a vinyl content of from about 3 to about 50 mole percent, B^2 represents a diene polymer block having a vinyl content at least 10% greater than the vinyl content of B^1, and B^3 represents a diene polymer block having a vinyl content greater than B^1 but less than B^2.

29. The composition of matter of Claim 28 wherein B^1 represents a diene polymer block having a vinyl content of from about 3 to about 10 mole percent, B^2 represents a diene polymer block having a vinyl content of from about 50 to about 80 mole percent, and B^3 represents a diene polymer block having a vinyl content of from about 25 to about 70 mole percent.

30. The composition of matter of Claim 28 further comprising a copolymer block, the composition of matter having a general formula:

$$A\text{-}B^1\text{-}B^2\text{-}B^3$$

wherein A is a block prepared using a different monomer.

31. The composition of matter of Claim 30 further comprising a block copolymer, the copolymer having a general formula:

$$A\text{-}B^1\text{-}B^2\text{-}B^3\text{-}A$$